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#### REFERENCES

- Allen, L. H., Jr., "The Energy Budget at the Earth's Surface: A Study of the Carbon Dioxide Concentration Monitored Over an Agricultural Field Near Ithaca, New York: Interim Report," *Technical Report ECOM 2-681-3*, U.S. Army Electronics Command, Fort Monmouth, N.J., Feb. 1968, 254 pp.
- Bierhuizen, J. F., and Slatyer, R. O., "Photosynthesis of Cotton Leaves Under a Range of Environmental Conditions in Relation to Internal and External Diffusive Resistances," *Australian Journal of Biological Science*, Vol. 17, No. 2, May 1964, pp. 348-359.
- Bischof, W., and Bolin, B., "Space and Time Variations of the CO<sub>2</sub> Content of the Troposphere and Lower Stratosphere," *Tellus*, Vol. 18, No. 2/3, 1966, pp. 155-159.
- Brown, K. W., and Rosenberg, N. J., "Systematic Errors in Sampling and Infrared Analysis of CO<sub>2</sub> in Air and Their Influence in Determination of Net Photosynthetic Rate," *Agronomy Journal*, Vol. 60, No. 3, May-June 1968, pp. 309-311.
- Chapman, H. W., Gleason, L. S., and Loomis, W. E., "The Carbon Dioxide Content of Field Air," *Plant Physiology*, Vol. 29, No. 6, American Society of Plant Physiologists, Kutztown, Pa., Nov. 1954, pp. 500-503.
- Gaastra, P., "Photosynthesis of Crop Plants as Influenced by Light, Carbon Dioxide, Temperature, and Stomatal Diffusion Resistance," *Mededelingen Landbouwhogeschool*, Vol. 59, No. 13, H. Veenman und Zonen, N.V., Wageningen, The Netherlands, Nov. 1959, pp. 1-68.
- Horibe, Y., "Examples of Diurnal Change in CO<sub>2</sub> Concentration of the Air Above a Paddy Field," *Journal of Agricultural Meteorology*, Vol. 19, No. 2, Tokyo, 1964, pp. 155-156.
- Huber, B., "Die CO<sub>2</sub>-Konzentration in Pflanzengesellschaften," (The Concentration of CO<sub>2</sub> in the Plant Canopy), *Handbuch der Pflanzenphysiologie*, Vol. 5, No. 2, Springer-Verlag, Berlin, 1960, pp. 339-348.
- Lemon, E. R., "Aerodynamic Studies of CO<sub>2</sub> Exchange Between the Atmosphere and the Plant," *Harvesting the Sun*, Academic Press, New York, 1967, pp. 263-290.
- Long, I. F., Monteith, J. L., Penman, J. L., and Szeicz, G., "The Plant and Its Environment," *Meteorologische Rundschau*, Vol. 17, No. 4, Berlin, July/Aug. 1964, pp. 97-101.
- Monteith, J. L., "Measurement and Interpretation of Carbon Dioxide Fluxes in the Field," *Netherlands Journal of Agricultural Science*, Vol. 10, No. 5, P. van den Bergh, Wageningen, The Netherlands, 1962, pp. 334-346.
- Monteith, J. L., Szeicz, G., and Yabuki, K., "Crop Photosynthesis and the Flux of Carbon Dioxide Below the Canopy," *Journal of Applied Ecology*, Vol. 1, No. 3, Blackwell Scientific Publications Ltd., Oxford, 1964, pp. 321-337.
- Pales, J. C., and Keeling, C. D., "The Concentration of Atmospheric Carbon Dioxide in Hawaii," *Journal of Geophysical Research*, Vol. 70, No. 24, Dec. 16, 1965, pp. 6053-6076.
- Ruesch, J. D., "Der CO<sub>2</sub>-gehalt Bodennaher Luftschichten unter dem Einfluss des Windschutzes," (The CO<sub>2</sub> Content of the Layers of Air Near the Ground as Influenced by Shelterbelts), *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, Vol. 71, No. (116)2, Verlag Chemie, GMBH, Weinheim, West Germany, 1955, pp. 113-132.
- Tamm, E., and Krzych, G., "Zum Verlauf des CO<sub>2</sub>-gehaltes der Luft im Bereich landwirtschaftl." (On the Course of the CO<sub>2</sub> Content of the Air Within Agricultural Crops), *Zeitschrift für Acker und Pflanzenbau*, Vol. 112, No. 3, Paul Parey, Berlin, 1961, pp. 253-278.
- Thomas, M. D., and Hill, G. R., "Photosynthesis Under Field Conditions," *Photosynthesis in Plants, Plant Physiology Monograph*, Iowa State College Press, Ames, 1949, pp. 19-52.

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